Chapter 3

Planning

The CAS planning process involves a number of interdependent activities. Because battlefield situations and the information available about them are constantly changing, CAS plans must be continually adapted as time allows. In this way, the CAS planning process can build on itself with each step to create a new understanding of the situation. CAS planning should be considered a continuous learning activity that facilitates the exercise of judgment and not a fixed mechanical procedure.

SECTION I. BASIC CONSIDERATIONS

CLOSE AIR SUPPORT EMPLOYMENT PLANNING

CAS is a cyclic process marked by concurrent, parallel, and detailed planning. The MAGTF commander plans for the employment of CAS throughout the battlespace in deep, close, and rear operations. The decision to use CAS is based on subordinate unit missions and their need for support. Commanders consider the requirement for CAS throughout their areas of operations based on their scheme of maneuver and concept of operations.

Any element of the MAGTF may be designated the main effort to accomplish a critical task, and CAS may play an important role in the combined-arms approach to accomplishing the task. Once the time and place for decisive maneuver by the GCE is determined, CAS will require full integration into the plan. Therefore, the preponderance of CAS and the priority of fire support will normally be allotted to the main effort.

Timing should also be considered when planning CAS employment. Used too early, CAS aircraft may be forced to disengage before mission completion because of low fuel or ammunition; employed too late, CAS aircraft may miss part or all of the intended target and fail to have the desired effect. CAS planning must also account for the requirement to have qualified and proficient terminal controllers to ensure effective target attacks and to minimize fratricide.

Deep Operations

CAS employment planning for deep operations may include supporting reconnaissance forces or conventional forces with a deep operation mission. CAS in support of forces conducting deep operations is normally planned to be limited in scope and duration and to support attacking maneuver forces or special operations activities. Deep operations involving CAS may require additional coordination to deconflict with deep air support missions, such as air interdiction or armed reconnaissance.

Close Operations

The commander generally assigns most of his available CAS to the unit designated as the main effort. CAS aircraft and other fire support assets are postured to concentrate fires in support of the main effort. CAS is also a valuable asset for exploiting tactical success and pursuing a retreating enemy.

Rear Operations

Rear operations CAS is planned to counter deep enemy attacks against support forces operating in the friendly rear area. The responsiveness and firepower provided by CAS can greatly augment the combat power of rear area forces. The potential for fratricide is high in the rear area because of the larger number of support personnel and activities located in this area. CAS aircrews and terminal controllers must take special care to identify friendly forces and ensure that they are not harmed by CAS ordnance delivered against enemy forces.

Offensive Employment

CAS assists offensive operations with preplanned or immediate missions. This gives the MAGTF commander freedom of movement by delivering a wide range of ordnance and by destroying or neutralizing enemy forces. CAS planning for offensive operations depends on the type of offensive operation being conducted.

- **Movement to Contact.** CAS missions can be planned to support maneuver forces providing forward and flank security. Once contact is made, using CAS aircraft at the initial point of contact can overwhelm the enemy and force a premature deployment of his forces. CAS aircraft performing security missions maneuver according to the location or movement of the main body and known or suspected enemy units. Execution orients on rapid location of enemy forces and rapid development of the situation, engaging as necessary to ensure adequate time and space for friendly forces to gain positional advantage and seize the initiative. CAS may also be employed in the conduct of reaction force missions that support movement-to-contact operations. CAS aircraft performing reaction force support missions also maneuver according to the location of the main body, but they maintain positions displaced from the planned or suspected engagement area until contact is made.

- **Attack.** Commanders plan for and use CAS to support attacks against enemy forces. CAS can destroy critical enemy units or capabilities before the enemy can concentrate or establish a defense. CAS can also fix the enemy in space or time to support the movement and assault of ground forces. CAS adds to the concentration of firepower, the shock effect, and the violence against the enemy. CAS can help to isolate enemy forces on the battlefield and force the enemy to defend in a direction from which he is unprepared to fight. CAS is incorporated into the detailed planning and coordination involved in a deliberate attack.

- **Exploitation.** Exploitation is an offensive operation that usually follows a successful attack and is designed to disorganize the enemy and erode his cohesion. In exploitation, CAS is planned to sever escape routes, destroy fleeing forces, and strike unprotected enemy targets that present themselves as enemy cohesion deteriorates.

- **Pursuit.** In the pursuit, the commander attempts to annihilate the fleeing enemy force as the enemy becomes demoralized and his control disintegrates. Because the objective of the pursuit is destruction of the enemy, CAS can keep direct pressure on the enemy to prevent him from reorganizing or reconstituting.

Defensive Employment

CAS is inherently offensive in nature, but it can also be effectively employed to support the defense. In defensive operations, CAS can be planned and used to cause the enemy to deploy prematurely, to deny the enemy access to critical terrain for a specified time period, or to slow or stop the enemy's attack. CAS can be assigned to support both the mobile and the positional elements of the defense. Commanders may plan the use of CAS in the defense to:

- **Support Maneuver.** CAS complements maneuver forces and integrates with surface-delivered fires as part of a combined- arms attack.
- **Support Movement.** CAS supports the movement of friendly forces between positions.
- **Attack Penetrations.** CAS engages enemy units that have bypassed main battle area forces or penetrated friendly positions.

Reserve

In offensive operations, CAS can provide the ground commander with additional firepower to reinforce or exploit success. In defensive operations, CAS can provide a supported commander with highly mobile firepower to counterattack or support counterattack forces.

Alert Status

Aircraft may be placed on ground alert or launched into an airborne alert orbit near the battle area. Alert aircraft must be configured with weapons and ordnance appropriate for anticipated targets; if different kinds of targets are encountered, the aircraft and its weapons may be less effective. Airborne alert aircraft consume fuel as they orbit, and these aircraft eventually will have to be used or must depart to be refueled. Regularly scheduled aerial refueling can increase both the combat radius and time on station for fixed-wing aircraft if tankers can be suitably positioned.

CLOSE AIR SUPPORT MISSION PLANNING

Upon receipt of the mission, aircrews begin detailed mission planning. Aircrews select tactics and techniques that offer the best chance of mission success and accomplishment of the assigned task. The commander's intent is relayed as the purpose of the mission, which allows planners to adapt to changing situations and to exercise initiative throughout the process. Mission tactics and techniques must be flexible, innovative, and unpredictable. Aircrews conduct detailed mission planning to:

- Determine the required tactics
- Identify support requirements
- Coordinate the use of fire support, EW support, and C2.

Basic CAS planning begins with an analysis of mission, enemy, terrain and weather, troops and support available, and time available (METT-T). Additional factors will determine the tactics and techniques required to conduct a particular CAS mission. Appendices A and B outline additional CAS planning considerations.

- **Mission.** Planners study the mission to understand their objective, the specified and implied tasks to be performed in accomplishing the objective, and the supported commander's intent or purpose for conducting the mission. Understanding the mission's purpose is key, for it allows supported and supporting units the latitude to exercise initiative and exploit opportunities. In planning CAS missions, the FAC, or AO and aircrew, should understand the ground commander's objective, scheme of maneuver, C2 requirements, and criteria for specific rules of engagement (ROE). This understanding increases overall situational awareness by all participants and facilitates the initiative required to maximize CAS effectiveness.

- **Enemy.** By determining key enemy characteristics, such as composition, disposition, order of battle, capabilities, and likely courses of action (COAs), planners begin to formulate how CAS can best be used. Other considerations are the enemy's capability to conduct command and control warfare (C2W) and the potential or confirmed presence of chemical or biological contamination. From this information, CAS planners anticipate the enemy's ability to affect the mission and the potential influence enemy actions may have on flight tactics and techniques.

  As the threat level increases, prebriefing of aircrews and detailed mission planning become critical. The potential for the threat situation to change during the course of the mission makes communications and close coordination between the aircrews, control agencies, and the supported ground force crucial. In-flight updates on enemy activity and disposition along the flight route and in the target area may require the aircrews to alter their original plan and tactics. If the enemy is successful at disrupting communications, alternatives are planned to ensure mission accomplishment. Secure-voice equipment and frequency-agile radios can overcome some effects of enemy interference.

- **Terrain and Weather.** A terrain survey is used to determine the best routes to and from the target area. Where the terrain permits and when the threat dictates, flight routes should maximize the use of terrain masking to increase survivability against air defense systems. When practical, flight routes, holding areas, initial points (IPs), release points, and battle positions (BPs) should use terrain features that are easily recognizable, day or night. Broad area satellite imagery and air mission planning and rehearsal systems can assist in selecting optimum flight parameters.

  Weather plays a significant role in CAS operations. It influences both enemy and friendly capabilities to locate, identify, and accurately attack CAS targets. Weather can also influence the effectiveness of laser designators, precision-guided munitions (PGM), night vision devices (NVDs), and thermal imaging systems. Planners at every level require an understanding of the effects that weather can have on CAS aircraft navigation, sensors, and weapons systems.

- **Troops and Support Available.** Knowledge of friendly force troop location and movement is paramount. CAS operations must be fully integrated into the supported commander's scheme of maneuver and the fire support plan. Ideally, the support required to conduct a CAS mission is identified early in the planning process. Support for the CAS mission can then be requested with sufficient time to coordinate its use. CAS mission support requirements that must be determined include escort, EW, SEAD, tankers, reconnaissance, and C2 systems.

- **Time Available.** Time is the critical element in coordinating events and massing fires to achieve the combined-arms effect of ground and aviation forces. Adequate time must be available to ensure mission success. CAS planners must estimate the amount of time necessary to plan the mission, effect the necessary coordination, and execute the mission. Inadequate time management may result in reduced effectiveness and increased risk to aircrews and ground troops.

Target Considerations

The battlespace can contain a large variety of targets. The type and characteristics of these targets may differ greatly. The following target considerations are used when selecting attack tactics and ordnance:

Visibility. Visibility is more critical for long-range deliveries (e.g., free-fall bombs/rockets) than it is for short-range deliveries (e.g., retarded bombs and guns). Thick haze or smoke has a greater effect on low-level attacks than on steep-dive attacks because horizontal visibility is usually lower than oblique visibility. If enemy vehicles are moving, exhaust smoke, dust trails, and movement can indicate their location. Poor visibility can restrict laser and electro-optically guided ordnance. Target acquisition is usually easier when the sun is behind the aircraft.

- **Target Masking.** A target screened by valleys or other natural cover may be difficult to see on low-level attacks. An increase in altitude may be necessary to find the target.
- **Thermal Significance.** Many variables can affect a target's vulnerability to detection and attack by thermal systems. Recent operating conditions, time of day (thermal crossover), and target composition and background should all be considered.
- **Contrast and Brightness.** A major factor in target detection is the contrast of the target against its background. Camouflaged targets against a background of similar color may be impossible

to detect. All targets, regardless of contrast differences, are more difficult to locate under poor light conditions.

- **Target Defenses.** Valuable enemy targets are usually defended by surface-to-air missiles (SAMs), antiaircraft artillery (AAA), or automatic weapons. Losses from enemy air defenses incurred while attacking high-value enemy targets are minimized by reducing exposure times, jinking, using "stand-off" capable weapons, and employing EW.

- **Accuracy Versus Survivability.** Low-level tactics attempt to increase mission success by decreasing exposure to enemy air defenses. Additionally, greater firing accuracy is achieved by reducing the distance between the aircraft and the target. However, the lower an aircraft is and the closer it is to a target, the greater its potential vulnerability to other types of surface-to-air weapons (SAWs), indirect fire weapons, and small arms fire.

- **Weather.** Weather conditions are one of the most critical factors in visual attacks. Weather, as well as the position of the sun or moon, affects contrast and can prevent target acquisition by aircrews or the use of electro-optically guided ordnance. These same considerations also affect enemy air defense weapons that use optical sights. Rain and snow reduce visibility and can prevent an attack. Incorrectly assessed wind velocity can result in delivery errors.

CLOSE AIR SUPPORT NAVIGATION PLANNING

Coordinate Systems

Several different coordinate systems and datums are used around the world, even within U.S. forces. The use of multiple datums has led to inaccuracy and confusion during combat operations. The use of a common datum reference in the CAS process is essential and should be prescribed by the JFC or MAGTF commander. If the MAGTF commander does not designate a standardized datum or if there is any doubt about which datum is being used, units requesting CAS should specify the datum in the JTAR.

Currently there are 32 separate datums used in map production around the world. Many of these datums have several different ellipsoids. Although the long-term U.S. goal is to eventually refer to all geographic positions on the World Geodetic System, or a compatible ellipsoid, there are still 11 different ellipsoids used on U.S.-produced maps:

- Australian National or South American 1969
- Bessel 1841
- Clarke 1866
- Clarke 1880
- Everest
- Geodetic Reference System 1980
- International
- Modified Airy
- Modified Everest
- World Geodetic System 1972
- World Geodetic System 1984.

Aircraft Systems

Not all aircraft involved in the CAS process use the same coordinate reference system in their navigation systems. Variations exist in the ways different aircraft types use the military grid reference system (MGRS), the universal transverse mercator (UTM), latitude/longitude, and radar offset data. The standard for target location is MGRS/UTM (6 digit) grid coordinates; however, latitude/longitude may be requested if required by a particular aircraft's system. Many GPS receivers can compute quick, accurate coordinate conversions, if users are properly trained.

It is important to note that the MGRS is not identical to the UTM. Both are based on meters, but each will give a different prefix (number, or number and letter combination) to indicate distance from the equator. However, the last five digits of MGRS and UTM coordinates (nearest 1 meter) of easting and northing are identical. For example, Naval Air Station Oceana, Virginia, in MGRS is "18S VR 07791 75465," and in UTM is "18 407791 4075465." See Appendix C for specific aircraft navigation capabilities and coordinate reference system requirements.

CLOSE AIR SUPPORT LOGISTIC PLANNING

Preparing weapons, configuring aircraft, and scheduling tankers for aerial refueling requires time and coordination. The more specific and timely a CAS request, the higher the probability the allocated aircraft will be appropriately armed for the mission. Logistic efforts must ensure CAS is timely and responsive to adequately support the ground commander's scheme of maneuver.

Basing Modes

CAS aircraft may be operationally based in a number of ways. The more traditional basing modes include main operating bases on land and seabasing aboard naval ships afloat. Fixed-base and shipboard deployment generally offer the widest range of available ordnance, mission equipment, logistic support, and so on, but these locations are often well removed from the battle area. As a result, aircraft may have farther to fly to reach CAS target areas and have a longer turnaround time between missions. In addition to using main operating bases and ships, aircraft can be deployed to FOBs.

Forward Operating Bases

Forward deployment of CAS aircraft offers several advantages. Operating from locations close to the battle area can increase loiter time in the objective area, extend effective combat radius, and, perhaps most importantly, make the CAS firepower more responsive to ground commanders by shortening the response time. Preplanned logistic support is vital to ensure that sufficient ammunition, fuel, and servicing equipment are in position and ready for use when needed.

- **Responsibilities of Supported Units.** Supported units should provide a forecast of anticipated CAS targets, so that appropriate munitions can be transported to FOBs and prepared for use.

- **Responsibilities of Supporting Units.** Supporting units are responsible for keeping FOBs operational by planning for and carrying out logistical support. FOB logistical support is a function of the number and type of aircraft that use the location, operations tempo, quantity and type of munitions employed, and system-specific support requirements.

Forward Arming and Refueling Points

CAS aircraft can be supported through forward arming and refueling points (FARPs) located in the forward area. (See figure 3-1.) The FARP extends the effective combat radius of CAS aircraft, facilitates their responsiveness, and increases their time in the objective area. Rapid ground refueling (RGR) by appropriately equipped aircraft can also provide these same advantages. Preplanned logistic support is vital to ensure that sufficient ammunition and fuel, as well as the proper servicing equipment, are available when needed.

- **Support to FARPs.** Like FOBs, logistical support to FARPs is a function of the number of aircraft planning to use the FARP, the tempo of operations, the types of munitions to be employed, and other system-specific support requirements. There are aircraft-unique equipment requirements (e.g., munitions handling equipment) that must be addressed. As a minimum, CAS aircraft operations require the following coordination:

  - Number and type of aircraft staging through the FARP
  - Munitions, including weapon- or aircraft-specific munitions handling and support requirements
  - Petroleum, oil, and lubricant support, including specific needs
  - Sequencing (timing) of aircraft through the FARP
  - FARP security
  - Marine air traffic control mobile team (MMT) support.

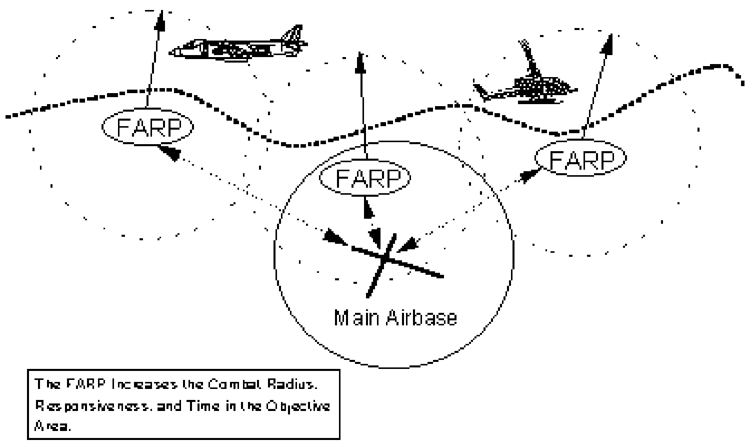


Figure 3-1. Forward Arming and Refueling Points.

SECTION II. CONTROL AND COORDINATION MEASURES

Commanders can employ a variety of measures to control and coordinate airspace and airspace users. The senior air control agency is responsible for deconflicting air operations by establishing control procedures to ensure the efficient and safe use of airspace. In joint operations, the airspace control authority deconflicts the airspace by publishing the airspace control plan and the subsequent airspace control orders. The air and ground commanders coordinate the use of control procedures to strike a balance between the ground force use of airspace and protection of aircraft using that airspace. Control and coordination procedures include airspace control measures and fire support coordination measures (FSCMs).

AIRSPACE CONTROL MEASURES

Airspace control measures increase operational effectiveness. They also increase CAS effectiveness by ensuring the safe, efficient, and flexible use of airspace. Airspace control measures speed the handling of air traffic within the objective area. Air C2 systems use airspace control measures to help control the movement of CAS aircraft over the battlefield. Airspace control measures are not mandatory or necessary for all missions.

Control Points

Control points route aircrews to their targets and provide a ready means of conducting fire support coordination. Control points should be easily identified from the air and should support the MAGTF's scheme of maneuver.

The senior FSCC and the ACE select control points based on MAGTF requirements. Appropriate MACCS agencies ensure that command and control issues are addressed during control point selection. The selected control points are then sent to the MAGTF commander for approval.

During amphibious operations, the MAGTF AO sends the MAGTF's list of control points to the ATF commander. The SACC analyzes the control points to determine their effect on other fire support means. The Navy TACC also reviews the selected control points. Once the control points are approved, the list is published in the air annex to the operation order (OPORD). Additions or changes to control points listed in the air annex are approved in the same manner as the original control points.

Multiuse Control Points

If possible, control points should be usable by a variety of aircraft. The Marine TACC identifies the specific use for each control point as the tactical situation dictates. The ATO states the control points' daily intended use. The following paragraphs identify multiuse control points. Figure 3-2 provides an example of multiuse control points used for a CAS mission.

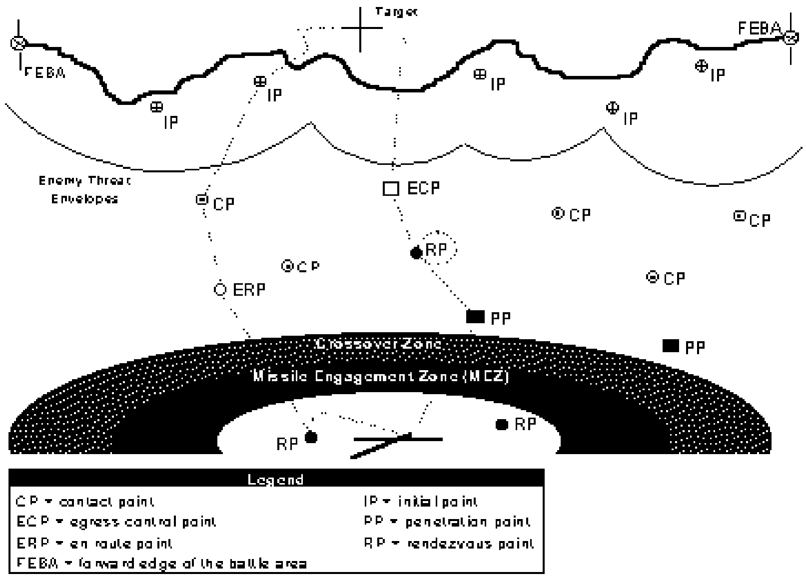


Figure 3-2. Example of Multiuse Control Points for a Close Air Support Mission.

- **Entry Point/Exit Point (EP).** EPs are used to enter/exit the AOA. At EPs, the aircrew must contact the TACC (Navy or Marine) for further clearance.

- **En Route Point (ERP).** ERPs are used to define routes of flight to and from the target area. ERPs allow specific routing of aircraft for C2, airspace limitation, or ROE requirements. For the ingress routes, ERPs are placed between the rendezvous point (RP) and the contact point (CP). For the egress routes, the ERPs are placed between the egress control point (ECP) and the penetration point (PP).

- **Orbit Point/Holding Point**. Orbit points and holding points either represent geographic positions or are defined and fixed by electronic means. These points are used to station aircraft inside the AOA, keeping them in a specific area of airspace while they await further routing instructions. An orbit point is used during tactical operations when a predetermined pattern would be predictable and therefore is not set. A holding point prescribes a predetermined pattern and is normally used while awaiting air traffic control clearances. A control point can be dual-designated as both an orbit point and a holding point, although orbit points and holding points are usually separate and distinct locations.

- **CP.** A CP is “the position at which a mission leader makes radio contact with an air control agency.” (Joint Pub 1-02) Normally, a CP is outside the range of enemy SAWS and is 15-30 nautical miles (NM) from the IP. During ingress, the aircrew contacts the terminal controller at the CP. A CP allows coordination of final plans before entering heavily defended airspace.

- **IP.** The initial point is “used as the starting point for the bomb run to the target.” (Joint Pub 1-02) IPs are well defined and easily identified (visually or electronically) and are located 5-15 NM from the target area. Terminal controllers and aircrews use IPs to help position aircraft delivering ordnance.

- **RP.** An RP is a prearranged geographic location where aircraft meet after takeoff or after exiting the target area.

- **ECP.** An ECP is a well-defined geographical control point outside the enemy air defense area. The ECP identifies a CAS aircrew’s egress from the target. Contact with terminal controllers normally ends at the ECP. The DASC is the overall coordinator for the ECP. A FAC, FAC(A), or TAC(A) can control the ECP. An aircrew can use an ECP as a secondary CP to start a second attack.

- **PP.** A PP is used for reentry into the friendly air defense network. PPs are located beyond the intercept zone of the friendly SAM network. Aircraft with operating identification, friend or foe (IFF) equipment or communications with the TAOC continue with their recoveries from the PP. Aircraft without IFF equipment or communications execute prebriefed identification procedures at or before the PP or wait at the PP for rendezvous with friendly escort aircraft.

Note: The PP is different from a penetration control point. A penetration control point is used to cross a hostile coastline during amphibious helicopterborne operations.

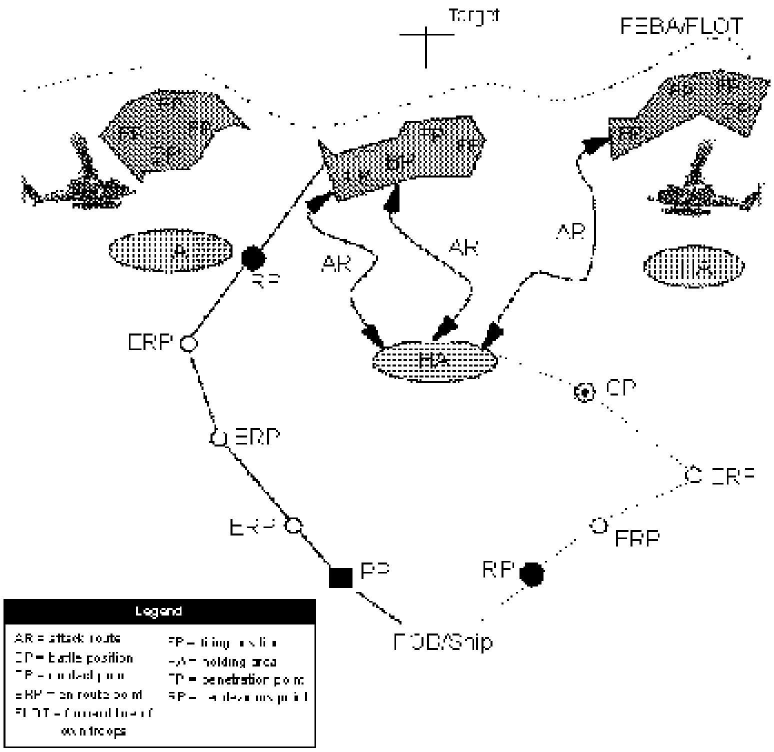
Rotary-Wing Control Points

In addition to multiuse control points, there are rotary-wing-specific control points. Figure 3-3 provides an example of control points that are unique to rotary-wing CAS planning and employment.

- **Holding Area (HA).** The HA is occupied while awaiting targets or missions. While in the HA, aircrews receive the CAS briefing and perform final coordination. Aircrews can receive updated target or mission information in a face-to-face brief or over the radio. After receiving the brief, aircrews move along attack routes (ARs) to BPs or individual firing points (FPs).
    - HAs can be located near regimental or battalion headquarters to take advantage of their communications connectivity. Terminal controllers can also locate HAs at their position.

Figure 3-3. Rotary-Wing Control Points.

- The HA should be well forward yet provide cover and con-



cealment from enemy observation and fires. The HA should be large enough for adequate dispersion and meet all landing zone selection criteria.

- Because the HA is well forward, it may be necessary to supplement its security by providing it with a small security force. It must also be supplied with the necessary communications for coordinating a launch. The availability or use of messengers should also be considered and planned for.

- **BP.** The BP is an airspace coordination area that contains firing points for attack helicopters (Marine Corps Reference Publication (MCRP) 5-2C draft, *Marine Corps Supplement to the DOD Dictionary of Military and Associated Terms*). FPs are normally positioned laterally and in-depth. BPs should allow good cover and concealment, provide necessary maneuvering space, allow for appropriate weapons engagement zones (WEZs), and be reasonably easy to identify. BP selection begins during premission planning. A coordinated effort between air and ground units in the selection of BPs is optimal. Maneuvering time spent in the BP should be minimal to prevent detection and engagement by the enemy. Once the terminal controller clears aircraft into a BP, flight outside of the BP to attack or to egress is not authorized unless cleared by the terminal controller. Uncoordinated egress from the BP may interrupt other supporting fires and endanger CAS aircrews. Aircraft have freedom of movement within the BP unless restricted by the CAS aircraft flight leader. To avoid enemy counterfire, the CAS aircraft may need to displace and resume the attack from a different BP. Therefore, alternate BPs should be established. Often rotary-wing aircraft use BPs in the same manner that IP fixed-wing CAS runs use IPs. BP-to-target distances in these instances will vary depending on the threat, terrain, and weapons systems available. BP selection is based on the following:

  - **METT-T/Supporting Arms Deconfliction.** The BP must support the mission requirements and be integrated into the scheme of maneuver. It must provide deconfliction with gun-target lines and fixed-wing attack profiles. It must also ensure that potential BPs are examined for communications limitations.

- **Adequate Maneuver Area.** The BP must be large enough to contain the CAS aircraft and provide safe and flexible maneuver between various FPs. It must provide flexible delivery profiles to ensure accurate weaponeering by the CAS flight.

- **Prevailing Wind.** Wind will affect target marks and artificial illumination and may obscure follow-on targets if the first target engaged is upwind from the remaining targets. To maintain the element of surprise and to minimize acoustic signature detection, the BP can be located downwind from the target. However, aircraft remaining downwind after the initial target engagement could experience target obscuration from blowing dust and debris resulting from ordnance detonation and secondary explosions.

- **Visibility and Sensor Performance.** Target area visibility, and its associated effect on sensor performance, will influence the BP range to target. Fog, smoke, smog, low-lying clouds, and haze can degrade laser/IR sensors and weapons systems such that BP-to-target ranges may have to be significantly decreased for effective employment.

- **Target Altitude.** The BP should be at an elevation equal to or higher than the target area to allow for unobstructed weapon-to-target lines.

- **Terrain Relief.** Hilly and mountainous terrain enables the CAS aircrew to mask/unmask easily and aids in navigation. If a radar threat is expected in the objective area, the radar's capabilities should be examined to determine if acquisition is possible at the CAS aircraft's operating altitude.

- **Range.** BPs should be located so that the target area is within the effective WEZ of the aircraft's weapons systems. The BP should be outside the threat's WEZ, unless terrain masking and/or SEAD is available.

- **Field of Fire.** BPs should permit unobstructed sighting of targets throughout the target area. When laser weapons are to be employed, the BP's location must allow for appropriate laser employment geometry and account for safety restrictions.

- **Beaten Zone Optimization.** If area munitions deliveries (rockets/guns) should be required, the maximum amount of the target area should be covered by the beaten zone of the weapons. The BP should be positioned on axis with the long axis of the target area.

- **Sun/Moon.** If possible, the sun or moon should be behind or to the side (night time) of the attacking aircraft. This allows the CAS aircrew to view the kill zone and prevents the enemy from seeing and targeting the aircraft.

- **Background.** Terrain features behind the BP prevent the attacking aircraft from being silhouetted against the horizon.

- **Shadow.** If possible, terrain or vegetation should cover the BP with shadows to provide additional masking.

- **Rotorwash.** The BP location should reduce the effects of rotorwash on surrounding terrain (debris, leaves, snow, sand, and dirt).

- **Backblast.** The BP location should reduce the effects of weapon's backblast on surrounding terrain.

- **Jamming Axis.** Jamming axis alignment considers the positions of the jammer, the BP, and the threat. The intended target may, and many times will, lay outside this axis. The appropriate jammer-to-BP-to-threat alignment must be maintained, or the protection offered will be minimal. If the CAS aircraft exit the BP to attack the target, the jammer axis may require realignment to provide optimal protection to the attacking CAS aircraft.

If an approved BP does not exist, aircrews can plan a hasty BP in coordination with the terminal controller. If there is not a properly placed or existing BP, the terminal controller may create a new one. The new BP is identified by grid, by a known point or prominent terrain feature, or by shifting an existing BP. The terminal controller passes the new BP location to the FSCC for coordination.

- **AR.** CAS aircraft use an AR to move from the HA to the BP. Aircrews select primary and alternate ARs for ingress to and egress from the BP. If an airspace coordination area is required, the terminal controller or aircrew coordinates with the appropriate FSCC. The FSCC passes the airspace coordination area to all appropriate agencies. The ideal AR is a corridor that allows aircraft to move into the BP undetected. Detection, even if beyond the range of enemy air defense weapons, removes the advantage of surprise. ARs that run parallel to preplanned targets should be avoided as this may compromise more than one FP. Terrain and vegetation are used to conceal aircraft movement on the AR. Smoke, supporting arms, and EW measures can also conceal aircraft movement and prevent detection.

- **FP.** An FP is a specific point within the BP that a single aircraft occupies while engaging targets. Alternate FPs should be identified so CAS aircraft can displace after the initial engagement. The flight leader determines movement of aircraft within the BP.

Aircrews choose their own FPs even though the supported commander coordinates and controls the location of the BP.

Control Point Selection

- **Use of Terrain Features.** Advanced navigational equipment available on many CAS-capable aircraft, such as the GPS and the inertial navigation system (INS), can make the navigation process less difficult. Regardless, CAS planners should still select control points at or near significant terrain features.

- **Techniques**. Aircrews do not need to fly directly over a particular control point. However, precise navigation and adherence to control points may be necessary to deconflict with other fires. In the case of system failures, crews will have to use alternative methods of navigation. Furthermore, friction, stress, uncertainty, fatigue, and other factors common in war may complicate the tactical situation for CAS aircrews and terminal controllers. This may require reverting to simpler means of communication and navigation. Basic pilotage and navigation skills remain critical when conducting CAS.

FIRE SUPPORT COORDINATION MEASURES

Fire support coordination measures (FSCMs) facilitate the rapid engagement of targets and simultaneously provide safeguards for friendly forces. The supported commander establishes FSCMs based on the recommendations of the force fires coordinator (FFC)/fire support coordinator (FSC). The FFC/FSC coordinates all fire support impacting in the area of operations of the supported commander. Figure 3-4 depicts common permissive and restrictive FSCMs.

Figure 3-4. Fire Support Coordination Measures.